

THE VARIABILITY OF YOUNG CHILDREN'S ENERGY INTAKE

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Research conducted in the 1930s showed that, given nutritious choices, children can select an adequate diet without adult supervision.

Paradoxically, children grew well and were healthy despite patterns of intake at individual meals that were unpredictable and highly variable.

[1991] THE maintenance of a positive energy balance is critical in sustaining growth and health in children.

In **pioneering research** conducted 60 years ago, **Clara Davis studied the intake patterns of a group of infants on a pediatric ward who selected their own diets for several months.**

Her findings revealed a paradox. On the one hand, in the absence of adult attempts to control the infants' food intake, they grew well and were healthy, leading Davis to suggest "the existence of some innate, automatic mechanism for its accomplishment."

On the other hand, the children's mealtime patterns revealed that "tastes **changed unpredictably** . . . , refusing as we say 'to stay put.' . . . Meals were . . . a dietitian's nightmare."

Davis' observations are consistent with parental reports that young children's eating behavior is **erratic**: they eat "**like a bird**" **on one occasion** and "**like a horse**" **on another**, and foods avidly consumed one day are rejected the next.

[1991] To investigate in more detail the energy intake of young children, we measured 24-hour food intake for 15 children, from two to five years of age, on six days.

For each of the six days of the study, coefficients of variation were calculated for each child for each of the six meals and snacks (breakfast, lunch, dinner, and morning, afternoon, and evening snacks) and for total daily energy intake.

[1991] The children's intake at individual meals was highly variable, but total daily energy intake was relatively constant for each child.

The mean coefficient of variation for each child's energy intake at **individual meals** was **33.6 percent**;

in contrast, the mean coefficient of variation for each **child's total daily energy intake** was **10.4 percent**.

In most cases, high energy intake at one meal was followed by low energy intake at the next meal, or vice versa.

Although children's food consumption is highly variable from meal to meal, daily energy intake is relatively constant, because **children adjust their energy intake at successive meals**

[2010] Does children's energy intake at one meal influence their intake at subsequent meals?

Or do we just think it does?

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[2010] It is widely believed that young children are able to adjust their energy intake across successive meals to compensate for higher or lower intakes at a given meal.

This conclusion is based on past observations that although children's intake at individual meals is highly variable, total daily intakes are relatively constant.

We investigated how much of this reduction in variability could be explained by the statistical phenomenon of the variability of individual components (each meal) always being relatively larger than the variability of their sum (total daily intake), independent of any physiological compensatory mechanism.

We calculated, theoretically and by simulation, how variable a child's daily intake would be if there was no correlation between intakes at individual meals. We simulated groups of children with meal/snack intakes and variability in meal/snack intakes based on previously published values.

Although children's daily energy intakes are indeed considerably less variable than their individual components, this phenomenon was observed even when intakes at each meal were simulated to be totally independent.

We conclude that the commonly held belief that young children have a strong physiological compensatory mechanism to adjust intake at one meal based on intake at prior meals is likely to be based on flawed statistical reasoning.

SELF SELECTION OF DIET BY NEWLY WEANED INFANTS

AN EXPERIMENTAL STUDY *

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This experiment may be described briefly as that of (1) allowing newly weaned infants to choose their own foods in such quantities as they may desire from a fairly wide range of commonly used natural food materials, unmixed, unseasoned and unaltered except, in the case of some, by cooking in the simplest manner, and (2) assembling data on the food consumed and the condition of the infants.

It was hoped by this experiment to obtain information on the following points:

1. Whether infants of weaning age could and would when removed from the breast choose their own foods from those placed before them, without aid, as do adults, and in sufficient quantities to maintain themselves.

2. If they did so choose, would they eat few or many of the large number of articles offered, and would they eat indiscriminately what was nearest at hand, governed only by their caloric needs or would they show definite preferences, and if so, would these preferences tend toward a vegetarian, a carnivorous or an omnivorous type of diet?

3. Would such infants maintain themselves in a state of digestive health or would they suffer impaired digestion with general discomfort, vomiting, diarrhea or undigested food in the stools?

4. Would their growth, eruption of teeth, gain in weight and general well-being equal those of infants fed in the usual way on the diets commonly prescribed for this age?

[1928] ... It was further hoped that this experiment might throw some light on the question of whether the infant at this age has any instinctive means of handling either qualitatively or quantitatively the problem of nice adjustment of the various food elements, organic and mineral, necessary to optimal nutrition.

RESULTS OF THE SELF-SELECTION OF DIETS BY YOUNG CHILDREN*

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The self selection of diet experiment had for its subject infants of weaning age, *i.e.*, from six to eleven months of age, who had never had supplements of the ordinary foods of adult life. This age was chosen because only at this age could we have individuals who had neither had experience of such foods nor could have been the loss of soluble substances and without the influenced by the ideas of older persons and so would be without preconceived prejudices and biases with regard to them.

The children were studied for six years.